



500.43116X00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): K. SUZUKI, et al

Serial No.: 10/659,398

Filed: September 11, 2003

For: DISK ARRAY APPARATUS AND METHOD FOR
CONTROLLING THE SAME

**PETITION TO MAKE SPECIAL
UNDER 37 CFR §1.102(MPEP §708.02)**

MS Petition

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

July 12, 2005

Sir:

Applicants hereby petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). Pursuant to MPEP §708.02(VIII), Applicants state the following.

(A) This Petition is accompanied by the fee set forth in 37 CFR §1.17(h).

The Commissioner is hereby authorized to charge any additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

(B) All claims are directed to a single invention.

If the Office determines that all claims are not directed to a single invention, Applicant will make an election without traverse as a prerequisite to the grant of special status in conformity with established telephone restriction practice.

07/14/2005 HALI11 00000002 10659398

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130.00 DP

(C) A pre-examination search has been conducted.

The search was directed towards a storage system. In particular, the search was directed towards is directed towards a storage system. In particular, the search was directed towards a disk array apparatus and method for controlling the same. In particular, claims 1-13 are directed toward a storage system comprising a data line with a first type interface in the form of a serial interface. Each of a plurality of first type disk drive units has a first disk drive. Each first type disk drive unit has a second type interface corresponding to one of a plurality of converters. FIG. 2 illustrates, for example, a control board 59 that includes a circuit for controlling the disk drives based on a RAID scheme. See Specification at page 11, lines 4-6. With reference to FIG. 5, and by way of example, each of the disk drives 51 β is associated with a corresponding converter 170. See Specification page 13, line 15-22, wherein disk drives 51 are, for example, SCSI, FC-AL, serial ATA, and ATA. The converter may be, for example, built into the disk drive or installed outside of the disk drive. See, e.g. Specification, page 20, lines 14-27. Port bypass switches 160 (FIG. 5) (also known as PBC's) are used, for example, to bypass faulty disk drives. See, e.g., specification at page 19, lines 13-18.

Thus, the present invention provides plural Serial ATA (or ATA) drives which are connected under a controller of a disk array apparatus. Each Serial ATA drive includes a FC-Serial ATA converter or a serial interface (except Serial ATA) – ATA converter. If a computer system is configured to use the disk array

apparatus having a Fiber Channel (FC) interface, then by use of the structure of the present invention, the computer system can use a new-type disk array apparatus having Serial ATA drives without having to conduct extensive re-configuration of the computer system.

The search of the above features was conducted in the following areas:

<u>Class</u>	<u>Subclasses</u>
711	111, 114, and 163

Additionally, a computer database search was conducted on the USPTO systems EAST and WEST.

Additionally, a computer database search was conducted on the USPTO systems EAST and WEST.

(D) The following is a list of the references deemed most closely related to the subject matter encompassed by the claims:

<u>U.S. Patent Number</u>	<u>Inventor(s)</u>
6,449,709	Gates
6,684,295	Fujimoto et al
6,745,287	Fujimoto et al

<u>Published Patent Application</u>	<u>Inventor(s)</u>
2003/0110330	Fujie et al
2003/0212859	Ellis et al
2003/0221061	El-Batal et al
2003/0041278	Lin
2004/0078707	Apperley et al
2004/0010660	Konshak
2004/0111560	Takase et al
2004/0267516	Jibbe et al
2005/0027900	Petty

Foreign Patent Number

JP 2002-150746
JP 2002333954

Inventor(s)

Tanabe
Stephen

Published References

EMC 2-Gigabit Disk-Array Enclosure
(DAE2), FC and ATA Models, Hardware
Reference P/N 014003048, Rev A02

Author

EMC Corporation

A copy of each of these references (as well as other references uncovered during the search) is enclosed in an accompanying IDS.

(E) It is submitted that the present invention is patentable over the references for the following reasons.

It is submitted that the cited references, whether taken individually or in combination with each other, fail to teach or suggest the invention as claimed. In particular, the cited references, at a minimum, fail to teach or suggest in combination with the other limitations recited in the claims:

a first feature of the present invention as recited in independent claims 19 and 34 of a plurality of converters coupled to the data line and converting between the serial interface and the SATA interface and a plurality of SATA disk drives having some of the storage regions and each of the SATA disk drives having the serial interface and one of the converters built-in;

a second feature of the present invention as recited in independent claim 32 of a plurality of converters coupled to said data line and converting between said FC interface and said Serial Advanced Technology Attachment (SATA) interface and a plurality of SATA disk drives having some of said storage regions

and each of said SATA disk drives being bolted to said FC interface and each of said SATA disk drives having one of said converters built-in; and

a third feature of the present invention as recited in independent claims 33 and 35 of a plurality of converters coupled to said data line and converting between said FC interface and a Serial Advanced Technology Attachment (SATA) interface and a plurality of SATA disk drives having some of said storage regions and each of said SATA disk drives having said FC interface and each of said SATA disk drives having installed therein one of said converters.

To the extent applicable to the present Petition, Applicants submit that although the distinguishing features may represent a substantial portion of the claimed invention, the claimed invention including said features and their inter-operation provides a novel storage system and system and method related to or implemented in or by said storage system not taught or suggested by any of the references of record.

The references considered most closely related to the claimed invention are briefly discussed below:

Gates (U.S. Patent No. 6,449,709) discloses a method and system for implementing a stack save and restore process in a processor that includes a stack that operates as a circular stack and appears in the address space of the memory of the processor as a single point address location. Particularly, Gates discloses a computing system 100 having a host computer 110 which has a system bus 120, and system bus devices 130-132 which are connected to the system bus 120. The system bus device 130 is a fiber channel (FC) controller

that includes a host adaptor 140 that controls a peripheral bus 143 which is connected to a media interface serializer/deserializer 141 which allows data transfers between a fiber channel loop 150 to a FC device 160. The host computer 110 can, for example, be a personal computer having a system bus 120 and a FC serial bus 150. The device 130 can be a PCI board in the host computer 110. The host adaptor 140 and devices 160, 170 and 180 which connect to the FC serial bus 150 can respectively be a fiber channel device including a SERDES device, a SCSI device such a hard drive which connects to the system bus via a bridge 172. See col. 5, line 42 through col. 6, line 15 and Fig. 1.

As understood, Gates does not teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive unit, with each disk drive having a second type interface as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Gates does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32 and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Fujimoto (U.S. Patent No. 6,684,295) discloses a disk array control device with two different internal connection systems. FIG. 1 illustrates a disk array controller 1 including a disk IF unit 12 that executes RAID functions. The IF unit as taught includes, for example, two drives IF's 103 associated with the magnetic disk device 20 having HDDs, two microprocessors 101 for controlling input/output with respect to the magnetic disk device 20, and a cache memory (CM) access control unit 104 for controlling access to the cache memory unit 14 and a shared memory (SM) access control unit 105 for controlling access to the shared memory unit 15. The IF unit executes data transfer between the magnetic disk device 20 and the cache memory unit 14 along with transmission of control information between the microprocessor 101 and the shared memory unit 15. See col. 5, lines 26-40 and Fig. 1.

As understood, Fujimoto ('295) does not teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, with each disk drive having a second type interface, as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Fujimoto ('295) does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the

present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Fujimoto (U.S. Patent No. 6,745,287) discloses a disk array control device having an internal connection system for efficient data transfer. FIG. 1 illustrates two IF units 413 for Fiber Optic Channels (FCs), two IF units 414 for SCSI, and two disk IF units 415 for magnetic disk units. See col. 6, lines 32-37. As clearly illustrated, when the disk drives are connected to a respective IF unit, all disk drives are of the same type. See, e.g., FIG. 1, connection 180 for magnetic disk units and connection 182 for SCSI.

As understood, Fujimoto ('287) does not teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, with each disk drive having a second type interface, as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Fujimoto ('287) does not teach or suggest the above described first feature of the present invention as recited independent claims 19 and 34, the above described second feature of the present invention as recited independent claim 32, and the above described third feature of the present invention as recited independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Fujie (U.S. Patent Application Publication No. 2003/0110330) discloses a system and method of transferring data from a secondary storage controller to a storage media after failure of a primary storage controller. Particularly, Fig. 1 discloses a storage unit 10 having redundant arrays A and B which are connected to controllers 14 and 16 via a connection 12. The controllers 14 and 16 are connected to each other by a bus line 18. Each of the controllers 14 and 16 includes a Serial ATA (SATA) interface 32 and 48 respectively as illustrated in Fig. 2. As shown in Fig. 2, the storage controller includes a fiber channel connector 24, a processor 26, a fiber channel host protocol control means 28 for controlling a protocol between the fiber channel connector 24 and the processor 26, and cache memory 30 connected to the processor 26, wherein the cache memory 30 stores transfer data. In the storage unit 10, the controller 14 is connected by connection means 34 and the SATA 32 to storage media 36a-36h. The controller 16 has a similar construction. See sections [0033] – [0036], [0039]-[0044] and Figs. 1 and 2.

As understood, Fujie fails to teach or suggest a controller transferring data with a first type interface to a plurality of disk drive units, with each disk drive having a second type interface through a plurality of corresponding converters as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Fujie does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32 and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Ellis (U.S. Patent Application Publication No. 2003/0212859) discloses a storage system 300 as illustrated in Figs. 3 and 4 having a storage system controller 302 and at least one storage media 311. The storage system controller 302 includes a plurality of media controllers 301 each being coupled to a local microprocessor 306, host interface logic 310 and at least one storage media 311. As taught, the storage system 300 replaces a single ATA, SCSI or fire wire storage media with an array of storage media 311. The multiple media storage system 300 appears to the host as a single ATA storage media, a single SCSI storage media or a single fire wire storage media. The host interface 316 may take any of several forms including ATA, SCSI, FC or Ethernet. The host interface implements an ATA interface, a SCSI interface, FC interface and iSCSI interface so as to relieve the host of actually providing multiple storage medium interfaces 401 and drivers. See sections [0040]-[0048] and Figs. 3 and 4.

As understood, Ellis fails to teach or suggest a controller transferring data with a first type interface to a plurality of disk drive units, with each disk drive having a second type interface as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to

interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Ellis does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32 and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

EI-Batal (U.S. Patent Application Publication No. 2003/0221061) relates to a serial interface for a data storage array. EI-Batal may support a RAID configuration. See section [0053]. The system may be compatible with standard ATA (see FIG. 4A, section [0050]), and Serial ATA, SATA (see FIG. 4B, section [0051]). FIG. 5, illustrates that controller 501 has a serial interface 511 connected to each device 515 in array 525 in point-to-point fashion. The serial interface 511 is provided for the data storage array in which an array of data storage devices is an array of serial ATA data storage devices and a device controller is coupled to a network by a Fiber Channel (FC) link. As taught a controller 201 may also include specialized circuitry for performing error checking, for example, circuitry to calculate the exclusive OR function for generating parity. See sections [0052] and [0045] and claims 15 and 19.

As understood, EI-Batal fails to teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, each disk

drive having a second type interface through a plurality of corresponding converters, as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, El-Batal does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Lin (U.S. Patent Application Publication No. 2003/0041278) provides a RAID disk array control apparatus including, in FIG. 2, an interface converter 120. The interface converter 120 includes a plurality of serial to parallel interface converters 122. See section [0014].

As understood, Lin does not teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, with each disk drive having a second type interface, as claimed. All interfaces are IDE/ATA. See section [0014]. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Lin does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Apperley (U.S. Patent Application Publication No. 2004/0078707) discloses in Fig. 1a an adaptor 120, 128, 129 which is connected between the disk drives 102, 132, 133 and a SSA loop 123. Each disk drive 102, 132 and 133 has an interface in the form of an ATA or SCSI interface as per Fig. 1b. Each adaptor 120, 128, 129 is provided for converting the SSA interfaces 117, 118 and 119 of multiple initiators 114, 115, 116 to the particular interface of each disk drive 102, 132, and 133 such as, for example, a SCSI interface 110 of a disk drive. See sections [0013]-[0018], [0033]-[0042] and Figs. 1a and 1b.

As understood, Apperley fails to teach or suggest a controller transferring data to a first type serial interface to a plurality of disk drive units, each disk drive having a second type interface through a plurality of corresponding converters. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Apperley does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34,

the above described second feature of the present invention as recited in independent claim 32 and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Konshak (U.S. Patent Application Publication No. 2004/0010660) relates to a multi-element storage array. With reference to FIG. 1 and section [0039], controller 26 writes data to disk drives 24. Data may be transmitted over media 30 in serially or in parallel. See section [0040]. Storage modules 24 are preferably ATA standard disk drives. See section [0041]. Personality logic 32 is programmable to allow data storage module 20 to appear as a different storage device, such as a SCSI disk drive. See section [0043]. Personality logic 32 determines which disk drives 24 represent the virtual SCSI storage devices requested. See section [0044]. FIG. 3 illustrates controller 26 including therein a plurality of storage device interface logic 70. See section [0052].

As understood, Konshak fails to teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, each disk drive having a second type interface through a plurality of corresponding converters. According to Konshak storage device interface logic 70 is grouped together within controller 26, and not coupled to the data line and individually corresponding to the disk drives as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type

disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Konshak does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Takase (U.S. Patent Application Publication No. 2004/0111560) shows a disk array controller for controlling an array of hard disk drives. FIG. 1 illustrates disk array controller 100 configured by a plurality of disk array control units 101. See section [0041]. Each disk array control unit 101 includes an external device connection interface unit 102. See section [0043]. FIG. 6 shows the internal configuration of a disk array control unit 101. See section [0048]. In FIG. 6, disk interface unit 608 executes a RAID function and includes a drive interface 604 that interfaces with hard disk drive 5. See section [0051]. FIG. 7 shows a protocol translation interface that translates internal communication protocol to/from standard protocol (e.g., fibre channel, InfiniBand, IP). See section [0061-0062].

As understood, Takase fails to teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, with each disk drive having a second type interface through a plurality of corresponding converters, as claimed. According to Takase translation is provided within the

disk array controller 100, not individually corresponding to the disk drives as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Takase does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Jibbe (U.S. Patent Application Publication No. 2004/0267516) relates to a method for controlling and emulating an array of storage devices having different protocols. Jibbe relates to testing and emulation of various drives in a Storage Array Network (SAN). See section [0002]. The drives may be of various types, SCSI, Fibre, SAS, SCSI, SATA. See section [0020]. According to Jibbe the system and method do not require additional hardware and are used to monitor traffic. See section [0021].

As understood, while Jibbe generally recognizes that different drive types may be used in a system, the type of interface and converter and their corresponding arrangement are not disclosed. Thus, Jibbe does not teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, with each disk drive having a second type interface, as

claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Jibbe does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Petty (U.S. Patent Application Publication No. 2005/0027900) shows a shared I/O serial ATA (SATA) controller. FIG. 1 illustrates a plurality of SATA controllers 114, 116, 118, 120, which may present hard disks in a RAID configuration. See section [0052]. The SATA controller may provide port replication for four disk drives 126. See section [0052]. FIG. 3B shows a shared SATA controller 330 that contains resources for accessing a particular disk drive or set of drives. See section [0060].

As understood, Petty fails to teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, each disk drive having a second type interface. According to Petty, the SATA (i.e. Serial ATA) is a serial interface, but all corresponding hard disk drives are also SATA. Thus, a second type interface, as claimed, is not disclosed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally

configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Pettey does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Tanabe (JP Application No. 2002-150746) discloses a magnetic disk drive having apparatus to improve power consumption, vibration resistance, shock resistance and device reliability. As taught, the magnetic disk device includes an interface in which a 2.5 inch size magnetic device is made to have compatibility with the standard interface of a 3.25 inch size magnetic disk device. Thus, conversion of the ATA interface of the magnetic 2.5 inch size magnetic disk device 1a, 1b to, for example, SCSI or a fiber channel arbitrated loop, is implemented by flexible printed circuits 3 and 4 and a connector 5 package on an interface conversion board 6. See sections [0010], [0020], [0031], [0041] and Figs. 1-3.

As understood, Tanabe does not teach or suggest a controller transferring data to a first type serial interface to a plurality of disk drive units, each disk drive having a second type interface as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to

interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Tanabe does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32 and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

Stephen (JP Patent Application 2002-333954) shows a data storage system that includes an array controller 304 that allows a plurality of devices to be seen as a single device through a programmable function. See Abstract. A plurality of universal interfaces permit connections of different kinds of devices.

As understood, Stephen does not teach or suggest a controller transferring data with a first type serial interface to a plurality of disk drive units, with each disk drive having a second type interface as claimed. Thus, there is no teaching or suggestion herein that would allow for a computer system normally configured to interface to disk arrays having a fiber channel interface to interface with new-type disk array apparatuses having serial ATA drives without extensive re-configuration.

More particularly, Stephen does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in

independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims.

EMC Publication (2-Gigabit Disk-Array Enclosure (DAE2), FC and ATA Models, Hardware Reference P/N 014003048, Rev A02) discloses information about the EMC 2-Gigabit disk-array enclosure (DAE2) hardware for Fiber Channel disks and Advance Technology Attachment drives. The DAE2 enclosure discloses the use of a Fiber Channel Arbitrated Loop (FC-AL) as its interconnect interface. The enclosure can be connected to another DAE2 or a processor and is managed by store system software in RAID configurations. The enclosure has a standard version which includes Fiber Channel disk drives and FC-AL link control cards to manage them, whereas the DAE2 –ATA version uses ATA disk drives and FC-2-ATA link control card to manage the disk and provide an interface between the FC-AL and disk drives. Attention is directed to the passages on page 1-5, the second paragraph as on page 1-7 and the passages on pages 3-6 and 3-17 of the EMC publication. As discussed on each of these passages, two Link Control Cards (LCCs) are provided which are connected to the mid-plane within the enclosure so as to convert between fiber channel signals and the ATA protocol.

However, as understood, the EMC publication does not teach or suggest the features of the present invention, wherein plural SATA or ATA drives are connected under a controller of the disk apparatus and wherein each SATA drive includes a FC-Serial ATA converter or a serial interface-ATA converter that is

built-in to each drive so as to provide the interfacing. DAE2 as disclosed in the EMC publication does not show a built-in type converter, nor does it show that one converter is provided with respect to one disk drive as in the present invention.

More particularly, the EMC publication does not teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32 and the above described third feature of the present invention as recited in independent claims 33 and 35, in combination with the other limitation recited in each of the independent claims.

Therefore, since the cited references fail to teach or suggest the above described first feature of the present invention as recited in independent claims 19 and 34, the above described second feature of the present invention as recited in independent claim 32, and the above described third feature of the present invention as recited in independent claims 33 and 35 in combination with the other limitations recited in each of the independent claims, it is submitted that the claims are patentable over the cited references whether said references are taken individually or in combination with each other.

F. Conclusion

Applicant has conducted what it believes to be a reasonable search, but makes no representation that "better" or more relevant prior art does not exist. The United States Patent and Trademark Office is urged to conduct its own complete search of the prior art, and to thoroughly examine this application in

view of the prior art cited herein and any other prior art that the United States Patent and Trademark Office may locate in its own independent search. Further, while Applicant has identified in good faith certain portions of each of the references listed herein in order to provide the requisite detailed discussion of how the claimed subject matter is patentable over the references, the United States Patent and Trademark Office should not limit its review to the identified portions but rather, is urged to review and consider the entirety of each reference, and not to rely solely on the identified portions when examining this application.

In view of the foregoing, Applicant requests that this Petition to Make Special be granted and that the application undergo the accelerated examination procedure set forth in MPEP 708.02 VIII.

G. Fee (37 C.F.R. 1.17(i))

The fee required by 37 C.F.R. § 1.17(i) is to be paid by:

☒ the Credit Card Payment Form (attached) for \$130.00.

☐ charging Account _____ the sum of \$130.00.

A duplicate of this petition is attached.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.,
Deposit Account No. 50-1417 (500.43116X00).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.



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PETITION FEE

Under 37 CFR 1.17(f), (g) & (h)

TRANSMITTAL

Fees are subject to annual revision)

Send completed form to: Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	10/659,398
Filing Date	September 11, 2003
First Named Inventor	K. SUZUKI, et al
Art Unit	
Examiner Name	
Attorney Docket Number	500.43116X00

Enclosed is a petition filed under 37 CFR §1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/171.

Payment of Fees (small entity amounts are NOT available for the petition (fees)

☒ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1417:

☐ petition fee under 37 CFR 1.17(f), (g) or (h) ☒ any deficiency of fees and credit of any overpayments

Enclose a duplicative copy of this form for fee processing.

☐ Check in the amount of \$ _____ is enclosed.☒ Payment by credit card (From PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.**Petition Fees under 37 CFR 1.17(f):****Fee \$400****Fee Code 1462**

For petitions filed under:

- § 1.53(e) - to accord a filing date.
- § 1.57(a) - to according a filing date.
- § 1.182 - for decision on a question not specifically provided for.
- § 1.183 - to suspend the rules.
- § 1.378(e) for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.
- § 1.741(b) - to accord a filing date to an application under §1.740 for extension of a patent term.

Petition Fees under 37 CFR 1.17(g):**Fee \$200****Fee code 1463**

For petitions filed under:

- §1.12 - for access to an assignment record.
- §1.14 - for access to an application.
- §1.47 - for filing by other than all the inventors or a person not the inventor.
- §1.59 - for expungement of information.
- §1.103(a) - to suspend action in an application.
- §1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.
- §1.295 - for review of refusal to publish a statutory invention registration.
- §1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.
- §1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.
- §1.550(c) - for patent owner requests for extension of time in ex parte reexamination proceedings.
- §1.956 - for patent owner requests for extension of time in inter partes reexamination proceedings.
- § 5.12 - for expedited handling of a foreign filing license.
- § 5.15 - for changing the scope of a license.
- § 5.25 - for retroactive license.

Petition Fees under 37 CFR 1.17(h):**Fee \$130****Fee Code 1464**

For petitions filed under:

- §1.19(g) - to request documents in a form other than that provided in this part.
- §1.84 - for accepting color drawings or photographs.
- §1.91 - for entry of a model or exhibit.
- §1.102(d) - to make an application special.
- §1.138(c) - to expressly abandon an application to avoid publication.
- §1.313 - to withdraw an application from issue.
- §1.314 - to defer issuance of a patent.

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Registration No. (Attorney/Agent)

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Signature

Date

July 12, 2005

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.